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## AN OUTBREAK OF BOTULISM AT ST. ANTHONY'S HOSPITAL, OAKLAND, CALIF., IN OCTOBER, 1920.

By J. C. GEIGER, Epidemiologist, United States Public Health Service.

During the month of October, 1920, there occurred in the St. Anthony's Hospital, Oakland, Calif., an outbreak of botulism. There was a total of six cases, two of which could be considered mild and four severe. Of these latter, three died. Unfortunately none of these cases was recognized as botulism until the third day of illness, and therefore they were not immediately reported.

*List of cases.*

Case.	Hospital status.	Date of onset.	Termination.	Serum treatment.
Dr. E. S. ....	Bacteriologist. ....	1920. Oct. 15. ....	1920. Died Oct. 19. ....	No.
J. P. ....	Patient. ....	do. ....	do. ....	Do.
A. R. ....	Nurse. ....	do. ....	Died Oct. 20. ....	Yes (50 c. c.).
A. Ru. ....	do. ....	Oct. 16. ....	Alive. ....	Yes (200 c. c.).
S. W. ....	Patient. ....	do. ....	do. ....	Yes (100 c. c.).
J. M. ....	do. ....	do. ....	do. ....	No.

## EPIDEMIOLOGY.

Counting back from the onset of the first cases, the afternoon of October 15, and taking into consideration the often-observed incubation period, 24 hours, it was evident that the probable causative food was served at the noon meal of October 14. Due consideration, however, was given to the meals of October 13, 14, and 15. Facts learned about the noon meal of October 14 practically determined that it was this meal at which food infected with *B. botulinus* was served to the nurses and patients of St. Anthony's Hospital.

At this meal two vegetables were served, Irish potatoes and commercial canned spinach, together with soup and a fresh beef stew. The Chinese cook opened two cans of spinach (the product of a San Francisco firm), washed the contents under a cold-water tap, placed them in separate parts of a baking pan, and baked in a gas-stove oven for probably 10 to 20 minutes. The odor rising from this spinach permeated the kitchen and was so distinctly a "bad odor" that the matter was called to the attention of the Chinese cook by a nurse who was passing through the kitchen. The nurse traced this odor to the spinach, and the Chinaman acknowledged that one of the cans of spinach was "spoiled." Then, at the nurse's suggestion and while observed by her, he removed what he considered the spoiled portion, opened a fresh can, and warmed up the material again in the oven. A census of the hospital for this particular meal showed that there were 25 people. Of this number, 12 can be eliminated as not eating the meal or not touching the spinach portion of what was served to them. Of the remaining number (13), six came down with symptoms of botulism. This leaves seven other persons, all of whom ate of the spinach, some only tasting it. Two nurses of these seven showed acute symptoms suggestive of botulism six days after the meal. They were diagnosed as psychological or pseudo cases.

There is a distinct history that those who died ate several helpings of the spinach. There can be no doubt of the odor and the spoilage of one can; yet it is agreed that the can was not a "swell" or "springer." Dr. E. S. and A. R., both of whom died, noticed a "cheesy taste," as did others. One patient, S. W., came to the hos-

pital for a broken arm Thursday and left it Friday morning. He ate the spinach and remarked about its peculiar taste. The last observation, together with odor and taste of the spinach, practically made it conclusive that commercial canned spinach was involved in these cases. Unfortunately neither the can nor the discarded spinach was available for examination. The western branch of the United States Bureau of Chemistry, the State board of health, the canning industries, and the Public Health Service have actively cooperated in tracing this spinach and investigating the conditions of its canning and all matters pertaining thereto.

#### SERUM TREATMENT.

None of these cases was seen by members of the botulism commission until Tuesday evening, October 19. The symptoms were typical from the onset, and diagnosis should have been comparatively easy. Serum in 50 c. c. amounts, types A and B, mixed and diluted to 300 c. c. with sterile distilled water, were given intravenously after previous desensitization of the patient. J. F. died before the writer arrived, and A. R. received one injection before death. S. W. was a mild case, but received two injections. J. M., another mild case, was not discovered in San Francisco until October 23, and was hospitalized there. No serum was given him.

*A. Ru.*—This case was a severe one. When seen on the evening of October 19, there was extreme difficulty in breathing, swallowing, and speech. A distressing cough was present, with inability to lift the tenacious ropy mucus present in the throat. A left-side ptosis was complete and a "superimposed" double vision was present. Extreme weakness was particularly noted in attempts to lift or hold up the head. There was a very rapid pulse and subnormal temperature. The patient, though apprehensive, gave no indications of pain or worry. Every clinical sign, from our observations of other cases, predicated a fatal termination. Serum was administered on the 19th, 20th, 21st, and 22d. Following the second injection on the 20th, the patient complained of chilly sensations, the pulse rate began to fall, and the temperature was elevated several degrees. About four hours after this second injection of serum, speech became understandable, that is, the patient lost the thickness and difficulty of enunciation and choosing of words. Breathing and swallowing and the ptosis improved. Double vision disappeared, yet the vision remained decidedly impaired. Improvement continued to a complete recovery, except that a rather violent erythema still persisted. This case, obtained late and treated with botulinus serum, types A and B, gave many indications of improvement with treatment.

The results of the autopsies on Dr. E. S. and A. R. are not yet available.